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LOGGING DAMAGE INCREASES UNDER HEAVY CUTTING OF SECOND-GROWTH PONDEROSA PINE

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An Inland Empire study shows that heavy cutting in second-growth ponderosa pine causes considerable logging damage to residual trees. Less damage occurs under light cutting. These results were obtained from four sets of test-demonstration plots which were established to determine best management practices for second-growth ponderosa pine. Each set includes three plots of approximately 5 acres each, treated as follows:

1. Heavy cutting to a diameter limit of 14 to 16 inches, d.b.h., to remove 75 to 80 percent of the merchantable board-foot volume. This treatment is similar to the common practice of cutting all merchantable volume from young stands.

2. Light improvement cutting to remove 25 to 30 percent of the merchantable board-foot volume.

3. No cutting or control.

Logging on the test-demonstration areas provided an opportunity to observe the effects of logging on the residual trees.

The heavy cutting which removed 75 to 80 percent of the volume resulted in considerably greater damage than the light improvement cutting which removed 25 to 30 percent of the volume. The numbers of damaged trees 6 inches d.b.h. and larger per acre are shown in table 1 by type of damage, type of cutting, and location. Averages for the four locations show that seven trees per acre were completely destroyed by pushing over or breaking off when cutting was heavy, while under light cutting only two trees per acre were destroyed. The same ratio held for trees injured in other ways, principally by bark injuries.

Four trees per acre were infested with turpentine beetles (Dendroctonus valens) under heavy cutting and only one-half tree per acre under light cutting. About half of the trees with beetle infestations also had bark injuries.

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Inasmuch as fewer trees per acre remained after heavy cutting, the percentages of trees destroyed or damaged are more striking than numbers alone. Ten percent of the residual trees were destroyed and another 10 percent damaged in the heavily cut plots; only 2 percent were destroyed and 2 percent damaged under light cutting. Although many of the injured trees and beetle-infested trees will recover, their vigor and quality will be lowered.

Logging damage was greatest in stands of small, dense timber. The Usk plots, located in a 90-year-old, well-stocked stand, had 140 trees per acre before cutting with an average diameter somewhat less than that of the other stands. On the heavily cut plot, trees were taken to a 14-inch diameter limit. Logging damage was more severe on the Usk plots than in those stands where the diameter limit was 16 inches, as shown in table 1.

Of the trees broken off or pushed over, about two-thirds were in the suppressed crown class with diameters of 6, 7, or 8 inches. The remaining one-third were about equally divided among the other diameter and crown classes. Logging scars were about equally distributed among all size classes. The quality of logging on all of these areas was average or better. Using a combination of small tractor and power skidding, the loggers exercised special care and were closely supervised.

The results demonstrate one more reason why intermediate cuttings should be light in second-growth ponderosa pine stands. Heavy cutting, in addition to causing considerable logging damage, is believed to be poor practice because trees are cut at a period in their lives when volume growth is most rapid. Furthermore, it leaves a depleted growing stock of inferior trees. Light cutting, on the other hand, causes little logging damage, usually yields sufficient volume to make a profitable logging operation, and leaves a thrifty stand for future growth.

Table 1. Trees per acre, 6 inches d.b.h. and larger, damaged by logging in second-growth ponderosa pine stands under two intensities of cutting at four locations

Location	Heavy cutting (about 80 percent of the volume cut)			Light cutting (about 30 percent of the volume cut)		
	Trees broken off or pushed over	Trees with bark injuries	Trees infested with bark beetles 1/	Trees broken off or pushed over	Trees with bark injuries	Trees infested with bark beetles 1/
	Number of trees					
Chewelah	6	8	1	3	2	1
Springdale	4	4	3	½	½	½
Colbert	5	3	1	½	2	0
Usk	12	13	10	3	4	1
Average	7	7	4	2	2	½
	Percent					
Percentage of damaged trees in residual stand	10	10	5	2	2	½

1/ Dendroctonus valens (About half of the beetle-infested trees have bark injuries and appear under that heading also.)